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10/763,247	01/26/2004	Yutaka Kashihara	248162US2SX	8010

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EXAMINER	
GUPTA, PARUL H	

ART UNIT	PAPER NUMBER
2627	

NOTIFICATION DATE	DELIVERY MODE
06/18/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/763,247	KASHIHARA ET AL.	
	Examiner	Art Unit	
	Parul Gupta	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-16 are pending for examination as interpreted by the examiner. The amendment and arguments filed on 3/27/07 were considered with the following results.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. 1-4, 6-8, 10, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al., US Patent Publication 2005/0193318 in view of Hagenauer et al., US Patent 5,181,209.

Regarding claims 1, 6, 10, and 14, Okumura et al. teaches a signal evaluation method configured to evaluate a reproduction equalization signal reproduced from a recording medium and an information recording/reproducing apparatus and an information reproducing apparatus and outputting reproduction signals reproduced from a recording medium and an information recording medium from which reproduction signals, the reproduction signals being evaluated based on an evaluation value, are reproduced by use of a PRML (partial response and maximum likelihood) discrimination method (paragraph 0055), said method comprising: means for detecting matching between discrimination data and a plurality of predetermined bit pattern pairs of different groups (paragraph 0112); means for calculating a bit pattern (paragraph 0098) and corresponding two ideal responses (paragraph 0099) when the matching is detected;

means for obtaining Euclidean distances between the two ideal responses and equalization reproduced signals (paragraphs 0099 and 101); means for obtaining a difference between the Euclidean distances (necessary to find the least distance as explained in paragraphs 0099 and 0100); means for obtaining a mean value (necessary part of comparison of paragraph 0099) and a standard deviation (can be derived from the mean square error of paragraph 0116) with respect to the difference between the Euclidean distances; and means for calculating a quality evaluation value of a reproduction signal based on an appearance probability of the predetermined bit pattern, and a Hamming distance (paragraph 0120 describes the path metric difference, which is used as the Hamming distance and paragraph 0173 further explains the state transitions) between the predetermined bit pattern pairs (same as evaluating quality as given in paragraphs 0098-0102), wherein said information recording medium satisfies a requirement that the evaluation value is not more than 10×10^{-3} or 10×10^{-5} (paragraphs 0147 and 0148). Okumura et al. does not but Hagenauer et al. teaches means for calculating a miss-discrimination probability F(0) of the predetermined bit pattern from the mean value and the standard deviation (done by Viterbi detector as explained in column 4, lines 44-51); and calculating a quality evaluation value of a reproduction signal based on this value (column 4, lines 55-58). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the miss-discrimination probability in the system of Okumura et al. The motivation would be to provide reliability information for each symbol (column 4, lines 44-50 of Hagenauer et al.).

Regarding claim 2, Okumura et al. teaches a signal evaluation method according to claim 1, wherein said quality evaluation signal is used as a first evaluation value (paragraph 0275), a target signal is calculated based on a predetermined data sequence ("specific pattern" of paragraph 0127) and a predetermined partial response characteristic ("partial response properties" as given in paragraph 0145), an equalization error representing a difference in reproduction equalization signals is calculated (paragraphs 0047 and 0087) in each clock period (paragraph 0097), a second evaluation value based on the autocorrelation of said equalization error is used as an evaluation value for evaluating the signal quality (paragraphs 0006 and 0043), and said first evaluation value and said second evaluation value are used in combination to obtain final evaluation (abstract).

Regarding claims 3 and 4, Okumura et al. teaches a signal evaluation method, wherein the final evaluation is made based on the first evaluation value, wherein said quality evaluation value is used as a first evaluation value (paragraph 0275), the second evaluation value (paragraphs 0006 and 0043), and a third evaluation value, the third evaluation value being provided by an error correction decoder ("Viterbi decoder") and attributable mainly to a medium defect (paragraph 0043).

Regarding claim 7, Okumura et al. teaches an apparatus according to claim 6, further comprising: means for adjusting a recording waveform by use of a value calculated based on the mean value and the standard deviation (paragraph 0264).

Regarding claim 8, Okumura et al. teaches in paragraph 0264 an apparatus used as one of an information recording/reproducing apparatus and an information

reproducing apparatus and configured to produce an evaluation value by use of a signal evaluation method described in any one of claims 1, 2, 3, and 4, said apparatus comprising means for performing at least one of: adjustment of a recording waveform; an offset adjustment of a reproduction signal; gain adjustment; adjustment of an equalization coefficient; tracking control; focusing control; tilting control; and the adjustment of a spherical aberration.

3. Claims 5, 9, 11-13, and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al.

Regarding claim 5, Okumura et al. teaches the signal evaluation method of claims 1-4 and that a large number of sample bits are required upon measurement (paragraph 0018). Okumura et al. does not specifically teach the method wherein the evaluation value is calculated by use of equalization signals corresponding to 100,000 channel bits or more. However, the large number of sample bits means that the specific number given is just an optimization of ranges for the number of bits. Since 100,000 is a large number of sample bits, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the specific number of channel bits based on the teaching of Okumura et al. in order to ensure an accurate sample.

Regarding claim 9, Okumura et al. teaches an apparatus according to any one of claims 6 and 7, wherein the evaluation value is calculated by use of equalization signals corresponding to 100,000 channel bits or more. Okumura et al. does not specifically teach the method wherein the evaluation value is calculated by use of equalization signals corresponding to 100,000 channel bits or more. However, the large number of

sample bits means that the specific number given is just an optimization of ranges for the number of bits. Since 100,000 is a large number of sample bits, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the specific number of channel bits based on the teaching of Okumura et al. in order to ensure an accurate sample.

Regarding claims 11, 13, and 15, Okumura et al. teaches an information recording medium, wherein said quality evaluation signal is used as a first evaluation value (paragraph 0275), a target signal is calculated based on a predetermined data sequence ("specific pattern" of paragraph 0127) and a predetermined partial response characteristic ("partial response properties" as given in paragraph 0145), an equalization error representing a difference in reproduction equalization signals is calculated (paragraphs 0047 and 0087) in each clock period (paragraph 0097), a second evaluation value based on the autocorrelation of the equalization error is used as an evaluation value for evaluating the signal quality (paragraphs 0006 and 0043), and said first evaluation value and said second evaluation value are used in combination to obtain final evaluation (abstract), said information recording medium satisfying a requirement that the first evaluation value is not more than 10×10^{-3} or 10×10^{-5} (paragraphs 0147 and 0148) and the second evaluation value is not less than 12 or 15. Okumura et al. does not specifically teach the medium wherein the second evaluation value is not less than 12 or 15, but explains the benefit of having larger numbers in paragraphs 0147-0148 and explains that the value should be optimized. Thus, it would have been obvious to one of ordinary skill in the art at the time of the

invention to include the concept of the specific value based on the teaching of Okumura et al. in order to ensure an accurate sample.

Regarding claims 12 and 16, Okumura et al. teaches a recording information medium according to claims 11 and 15, respectively, wherein the final evaluation is made based on the first evaluation value, the second evaluation value and a third evaluation value (abstract), the third evaluation value being provided by an error correction decoder ("Viterbi decoder"), which performs error correction with respect to the reproduction signals, and attributable mainly to a medium defect (paragraph 0043), said information recording medium satisfying a requirement that the first evaluation value is not more than 10×10^{-3} or 10×10^{-5} (paragraphs 0147 and 0148), the second evaluation value is not less than 12 or 15, and the third evaluation value is not more than 280 for 8 consecutive ECC blocks (paragraph 0275 explains that the error rate as an influence of the signal quality evaluation value is several every 100 to 1000 bits, which is under the given value given the size of the block outputted by the ECC of element 123 of figure 15 as given in paragraph 0276). Okumura et al. does not specifically teach the medium wherein the second evaluation value is not less than 12 or 15, but explains the benefit of having larger numbers in paragraphs 0147-0148 and explains that the value should be optimized. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the concept of the specific value based on the teaching of Okumura et al. in order to ensure an accurate sample.

Response to Arguments

4. Applicant's arguments with respect to all claims have been considered but are not persuasive.

Regarding claim 1, applicant contends that Okumura does not teach calculating a Hamming distance, let alone calculating a miss-discrimination probability F(0) of the predetermined bit pattern from the mean value and the standard deviation; and calculating a quality evaluation value of a reproduction signal based on the miss-discrimination probability F(0), an appearance probability of the predetermined bit pattern, and a Hamming distance between the predetermined bit pattern pairs. However, nothing relating to the miss-discrimination probability was previously claimed. Paragraph 0120 describes the path metric difference, which is used as the Hamming distance and paragraph 0173 further explains the state transitions. The appearance probability is equivalent to the probabilities given in paragraph 0121.

Regarding claim 2, applicant contends that Okumura does not teach an evaluation value based on the autocorrelation of equalization errors. However, the section given of Okumura explains the equalization process. Based on the equalization, a difference is taken to determine error, yielding a value used for evaluation based on the equalization errors.

Regarding claims 3 and 4, applicant contends that the error correction decoder is not a Viterbi decoder. However, as a Viterbi decoder is a type of decoder used for error correction, it is still an error correction decoder.

Regarding claims 7 and 8, applicant contends that Okumura does not teach adjusting a recording waveform by use of a value calculated based on the mean value and the standard deviation. However, the cited section explains control of the quality of signal. This is still control of the signal based on the values given. Thus, it is adjustment of a recording waveform.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parul Gupta whose telephone number is 571-272-5260.

The examiner can normally be reached on Monday through Thursday, from 8:30 AM to 7 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PHG
6/6/07

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER